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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/708,595	03/12/2004	Premjit J. Daniel	GEMS 0237 PA	2594
27256	7590	11/25/2005	EXAMINER	
ARTZ & ARTZ, P.C. 28333 TELEGRAPH RD. SUITE 250 SOUTHFIELD, MI 48034			HO, ALLEN C	
			ART UNIT	PAPER NUMBER
			2882	

DATE MAILED: 11/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 10/708,595	Applicant(s) DANIEL ET AL.	
	Examiner Allen C. Ho	Art Unit 2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 15-20 is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: **45**.
2. The drawings are objected to under 37 CFR 1.83(a) because they fail to show semicircular grooves **50** in the sleeve as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d).
3. Fig. 3A is objected to because reference number **60** on the right should be deleted.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will

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be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

4. The disclosure is objected to because of the following informalities:
 - (1) Paragraph [0034], line 6, it is unclear what the symbol f is;
 - (2) Paragraph [0045], lines 2 and 6, "cathode 25" should be replaced by --anode 28-- since it is the anode, not cathode, that emits x-rays;
 - (3) Detailed description does not refer to the figures.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 7-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 7-12 recite "said thermally conductive sleeve at least partially surrounding said x-ray source." This limitation is indefinite since claim 1 does not actually claim an x-ray source. The recitation "adapted to enclose an x-ray source" is construed as intended use. The applicants are advised to amend claim 1 to positively claim an x-ray source in the body of the claim.

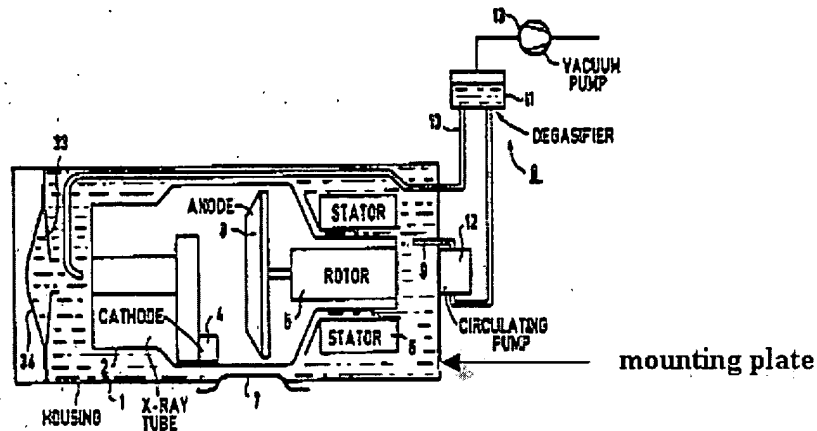
Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claim 1, 3-5, 7, and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Gerth (U. S. Patent No. 5,222,118).



With regard to claim 1, Gerth disclosed a cooling system for an imaging system comprising: a mounting plate comprising a first side and an opposing second side, the mounting plate further defining at least one opening; at least one heat conductor (9) extending through the at least one opening and through at least a portion of a dielectric fluid reservoir defined adjacent the second side of the mounting plate and adapted to enclose an x-ray source; and a heat sink (a heat absorbing device, 11) coupled to the first side of the mounting plate, the heat sink receiving at least a portion of the at least one heat conductor.

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With regard to claim 3, Gerth disclosed the system of claim 1, further comprising a second heat conductor (10) spaced apart from the first heat conductor and extending through a second opening defined in the mounting plate.

With regard to claim 4, Gerth disclosed the system of claim 1, further comprising a plurality of spaced apart openings in the mounting plate arranged in an arc (the two openings can be fit to an arc).

With regard to claim 5, Gerth disclosed the system of claim 4, further comprising a plurality of heat pipes extending through the plurality of spaced apart openings.

With regard to claim 7, Gerth disclosed the system of claim 1, further comprising a thermally conductive sleeve (2) coupled to the at least one heat conductor, the thermally conductive sleeve at least partially surrounding the x-ray source.

With regard to claim 13, Gerth disclosed the system of claim 1, further comprising a second x-ray shield (1) coupled to the heat sink.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gerth (U. S. Patent No. 5,222,118) as applied to claim 1 above.

With regard to claim 2, Gerth disclosed the system of claim 1. However, Gerth failed to teach that at least one heat conductor comprises a polygonal, semi-circular, or irregular cross-section.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to employ a heat conductor that comprises any cross-section, since a person would be motivated to employ a heat conductor having a cross-section to convey the dielectric fluid. The shape of the cross-section is irrelevant as long as the dielectric fluid is being conveyed to where it is supposed to go.

11. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gerth (U. S. Patent No. 5,222,118) as applied to claim 1 above, and further in view of Cheon (U. S. Patent No. 6,313,990 B1).

With regard to claim 6, Gerth disclosed the system of claim 1. However, Gerth failed to teach that the heat sink comprises a plurality of thermally conductive blocks coupled to the first side of the mounting plate, or a solid thermally conductive block coupled to the first side of the mounting plate.

Cheon disclosed a heat sink (36) that comprises a plurality of thermally conductive blocks (44).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide the heat sink with a plurality of thermally conductive blocks, since a person would be motivated to increase the cooling capacity of a heat sink.

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12. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gerth (U. S. Patent No. 5,222,118) as applied to claim 1 above, and further in view of Dilick (U. S. Patent No. 6,254,272 B1).

With regard to claim 14, Gerth disclosed the system of claim 1. However, although Gerth disclosed a dielectric fluid (electrically insulating liquid, column 3, lines 6-8), Gerth failed to teach that the dielectric fluid comprises at least one of petroleum or silicone.

Dilick taught that a fluid of petroleum derivative is suitable for use as insulating fluid for an x-ray tube.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a dielectric fluid that comprises petroleum, since a person would be motivated to use a fluid that has demonstrated its applicability as an insulating fluid for an x-ray tube.

Allowable Subject Matter

13. Claims 15-20 are allowed.

14. The following is a statement of reasons for the indication of allowable subject matter:

With regard to claims 15-19, although the prior art discloses a cooling system for an imaging system including an x-ray source comprising a mounting plate comprising a first side and an opposing second side, the mounting plate further defines a plurality of openings spaced apart from each other, a plurality of heat pipes extending through the plurality of openings, a plurality of thermally conductive fins coupled to the first side of the mounting plate, the plurality of thermally conductive fins receiving at least a portion of each of the plurality of heat pipes, it

fails to teach or fairly suggest that the cooling system further comprises an x-ray shield surrounding the x-ray source, the x-ray shield comprising a first end and a second end, the first end defining a plurality of openings receiving the plurality of heat pipes, the first end spaced a distance from the second side of the mounting plate, the second end defining an opening for x-rays from the x-ray source to exit as claimed.

With regard to claim 20, although the prior art discloses a cooling system for an imaging system including an x-ray source comprising a housing defining a dielectric oil reservoir enclosing the x-ray source, a mounting plate comprising a first side and an opposing second side such that the second side defines a boundary of the dielectric oil reservoir, the mounting plate further defining a plurality of openings spaced apart from each other in an arc formation, a plurality of heat pipes extending through the plurality of openings, a plurality of thermally conductive fins arranged parallel to the first side of the mounting plate, the plurality of thermally conductive fins receiving at least a portion of each of the plurality of heat pipes, it fails to teach or fairly suggest that the cooling system further comprises a generally arc-shaped thermally conductive sleeve at least partially surrounding the x-ray source, and an x-ray shield enclosing the generally arc-shaped thermally conductive sleeve and arranged trans-axially thereto with the housing as claimed.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

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- (1) Lacey *et al.* (U. S. Patent No. 2005/0117698 A1) disclosed an apparatus for thermal management of CT electronics.
- (2) Radley *et al.* (U. S. Pub. No. 2004/0218725 A1) disclosed a device for cooling an x-ray tube.
- (3) Snyder (U. S. Patent No. 6,608,429 B1) disclosed an x-ray imaging system with convective heat transfer unit.
- (4) Richardson *et al.* (U. S. Patent No. 6,519,317 B2) disclosed a dual fluid cooling system. for high power x-ray tubes.
- (5) Rogers (U. S. Patent No. 6,263,046 B1) disclosed heat pipe assisted cooling of x-ray windows in x-ray tubes.
- (6) Snyder (U. S. Patent No. 6,252,937 B1) disclosed high thermal performance cathode via heat pipes.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen C. Ho whose telephone number is (571) 272-2491. The examiner can normally be reached on Monday - Friday from 8:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick can be reached at (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Allen C. Ho
Primary Examiner
Art Unit 2882

22 November 2005